

# Foale reports conditions ‘getting back to normal’

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Tsibliev was testing the Progress' manual redocking system, guiding the capsule by using the teleoperated "TORU" system from the core module. The collision occurred shortly before the beginning of a communications pass with Russian ground controllers. When communication was established at 4:18 a.m. CDT (1:18 p.m. Moscow time), the crew informed controllers that the vehicle had struck the station and that the station was losing pressure.

Progress had come in very fast, Tsibliev reported, and he could not stop it. Progress struck a solar array and a nearby radiator on the Spektr module, causing Spektr to begin losing pressure.

The crew acted quickly to seal off Spektr, and at 5:53 a.m. CDT reported that the station's pressure had stabilized and Progress had separated to a safe distance from Mir. The station initially was spinning at approximately one degree per second due to the collision, but the spin had stopped and Mir

returned to a stable condition. To conserve power the crew shut down thermal control systems, ventilation systems, and experiments.

The Spektr module contains several NASA science experiments, stored items, and Foale's personal effects. Spektr experiments include a centrifuge, radiation monitoring experiment, and earth observation equipment. Food, water, and other supplies are stored in other modules. The accident also resulted in the loss of power from Spektr's four solar arrays, which furnish Mir with about half its electricity. Contingency operations for the next several days focused on optimizing power generation and charging batteries.

By Saturday morning, Foale, communicating through NASA's Wallops Island, Va., station, told Phase I managers that most systems and some experiments had been reactivated, and that "life has been getting

back to normal for me." A downlink video released through Russia early Sunday showed the crew apparently comfortable, rested, and in good humor, and the interior of Mir to be well lit. Monday, Mir had regained automatic attitude control through its gyrodyne system.

The Russian Space Agency moved quickly to establish teams to investigate the cause of the accident and to review contingency options to work toward the restoration of normal activity aboard Mir. At week's end, the Russian Mission Control Center was conducting additional tests with the Progress in an effort to understand the malfunction.

Yuri Koptev, the head of the Russian Space Agency, discussed plans to recover power from the three undamaged Spektr solar arrays. He announced a special "plate" is being manufactured that will be mounted between the node to which the Core module

and the Spektr are attached during an internal "space walk" by Tsibliev and Lazutkin in mid-July. Foale will be stationed in the lower stage of the Soyuz capsule during the procedure, and will be wearing his own space suit.

Koptev said that the plate, through which 22 cables can be passed, is in the final stages of manufacture. The cables will be used to bring power from the Spektr arrays to the Core module to maintain proper charging of a variety of Mir batteries, and to restore the capability to gimbal the arrays for maximum exposure to sunlight.

The suited cosmonauts' activities could also include an inspection of Spektr to locate the puncture or gash that resulted from the collision and perhaps efforts to retrieve some items from inside Spektr. This plan does not include action to patch or restore pressure to the Spektr module.

The repair items would be delivered to Mir on the next Progress ship, now scheduled for an early-July launch.



## Jett manages NASA training in Star City

Astronaut Brent Jett will replace Michael Lopez-Alegria as the NASA manager of operational activities at Star City, Russia, near Moscow.

The eighth astronaut to serve in this rotational position, Jett will continue to support the training and preparations of NASA astronauts at the Gagarin Cosmonaut Training Center, Star City. The Navy commander will be the primary liaison between NASA and GCTC management, and will continue the operational and personal relationships with Star City management and the cosmonauts as American astronauts continue to live and work in Russia.

Jett, who departed for Russia on June 22, joins fellow astronauts Wendy Lawrence, Dave Wolf, Bill Shepherd and Andy Thomas, currently training in Star City. Lopez-Alegria will return to JSC to begin training as an extravehicular activity crew member for STS-92, an assembly mission for the International Space Station.



Jett



NASA Photo

**Video footage taken by Mir crewmembers June 25 and downlinked to Earth shortly after the collision depicts damage done by a collision with the Proton resupply vehicle during docking maneuver testing. The crew remains in good health.**

## Imax to document station assembly in 3-D

The film format some astronauts have called the closest thing to actually being in space will be used to document the assembly of the International Space Station.

Imax and NASA are cooperating on their sixth effort to convey the space experience through film. The new film will begin production next year and will document the assembly of the International Space Station in the 3-D Imax format. It is hoped that the three dimensional aspect of the production will help to convey this exciting new phase in the space program.

"Capturing the assembly of the International Space Station in this realistic and compelling format will help NASA share this experience with the public. After all, the station

belongs to the public and they have a right to watch it become a reality," said NASA Administrator Daniel S. Goldin.

Production plans include two cameras to cover the early phase of station construction. One camera will be placed in the shuttle cargo bay to capture the assembly space walks and exterior construction footage. The cargo bay camera is designed with a multi-focal turret lens which will allow for the greatest range of perspectives. An interior, hand-held camera will document the crew activities inside both the shuttle and the new station. A new camera is being developed for this purpose. In addition to accommodating the 3-D film, the new camera is expected to be lighter and battery operated,

allowing for increased mobility.

Imax plans to document the construction of the new space station beginning with early ground-based training activities. The first 3-D Imax cargo-bay camera is scheduled to fly aboard STS-88, the second American assembly flight. The interior camera will be on the station beginning on the fourth American assembly flight and is scheduled to return after the seventh American assembly flight.

The contract between the space agency and the film company gives Imax three-year feature film rights but grants NASA ownership of raw film stock. Imax will also fund the hardware integration performed by JSC which will allow the footage to be shot.

## Pathfinder landing marks first Mars visit in decades

By Elizabeth Soutter

On July 4, the first U.S. exploration of the surface of Mars in 21 years will begin with the touchdown of the Pathfinder explorer on the surface of the red planet.

The Mars Pathfinder mission is the second launch in the Discovery Program, a NASA initiative for small planetary missions with a maximum three-year development cycle. It was built by the NASA's Jet Propulsion Laboratory and the California Institute of Technology.

Pathfinder is scheduled for a 12:07 p.m. CDT touchdown on July 4, ending a seven-month voyage through space. If conditions are normal, the vehicle will begin transmitting through a low-gain antenna, relaying telemetry from all engineering and subsystems and the first science data about the atmosphere taken during descent. A normal delay in communications means that the first signals from the surface of Mars will not be received until approximately 1:09 p.m. CDT.

A high-gain antenna transmission will be the next objective. Such a transmission would allow the vehicle to send the first pictures of the landing site to Earth. Initial images will be used to assess the condition of the craft and to gauge the status of the mission. The first color images will be of the immediate area surrounding the landing site. Partial panorama views will be transmitted in black and white.

The rover is scheduled for deployment around 8 p.m. JSC time that evening. The rover, named Sojourner, will provide the first black and white, 360-degree images of the Martian landing site. The Sojourner rover then will begin its mission, collecting data for transmission to Earth. The mission is expected to last seven Martian days, or Sols. A sol is equivalent to 24 hours, 45 minutes.

The rover is primarily a technology experiment itself, designed to test microrover performance in the poorly understood Martian terrain

so that future rovers may be designed to be effective in navigating and moving about the surface of Mars. The craft has three main objectives: technology experiments, science experiments and mission experiments.

Technology experiments will focus on the effectiveness of the Pathfinder/Sojourner design and include UHF link tests, a cataloging of sinkage in each Martian soil type, and vehicle performance data. Rover science experiments are aimed at gathering data on the planet itself, including an X-ray spectrometer and terrain imaging. Mission experiments are designed to assess the status of the vehicle and its capacity to perform as designed through lander imaging and damage assessments.

The microrover is powered by a solar panel that is backed-up by batteries. The craft is a six-wheeled vehicle of a rocker bogie design that allows the vehicle to move over large obstacles. Each wheel is independently actuated and geared, providing superior climbing capability in soft sand. The front and rear wheels are independently steerable, allowing for the vehicle to turn in place. The microrover's top speed is 0.4 meters per minute.

Commands for the microrover are generated and analysis of telemetry is performed at the microrover control station as part of the Pathfinder lander's ground control operation.

The name of the Sojourner rover was selected as part of an international contest of students under the age of 18. The students were asked to submit the name of a heroine and an essay describing why the microrover should be named for her.

The winning entrant was Valerie Ambrose, a 12-year-old student from Bridgeport, Conn. She submitted an essay advocating Sojourner Truth, an African-American woman who lived during the Civil War era and was an activist and champion of abolition and women's rights. The name Sojourner means traveler.

## Strong El Niño developing; forecasters predict local impact

With hurricane season beginning, weather forecasters and local residents alike are turning their attention to unusually strong El Niño air mass conditions developing over the Pacific Ocean.

The El Niño is an abnormal state of the ocean-atmosphere system that develops every few years. It involves warming of surface waters, and can have important consequences for weather around the globe. It appears this El Niño will be the strongest to develop since the fall of 1982. El Niño effects are likely to be observed the coming November through March in the form of cooler and wetter weather for the southern half of the United States, and unusually

warm weather in the northern half of the country.

The El Niño of 1982 was the greatest ocean-atmosphere disturbance ever recorded. Its effects were especially powerful in the Gulf Coast states. Heavy rains and flooding in this region were blamed for \$1.2 billion in losses to property and agriculture between December 1982 and May 1983. At least 50 deaths also resulted from flooding. Meteorologists at the Southern Region Headquarters of the National Weather Service compiled the following assessment of other effects in the South that were linked to that El Niño:

In every Southern state, from New Mexico

to Florida, flooding occurred at some time between November 1982 and October 1983, and much of it was attributed to weather systems triggered by the unusually strong El Niño. Numerous rainfall and flood records were set. Florida and Louisiana experienced record-breaking drenchings that persisted for months. Heavy rains in December boosted the 1982 total for parts of Louisiana to nearly 90 inches, more than 1 1/2 times the normal rainfall. During the year severe major flooding also struck Mississippi, Arkansas, Oklahoma, and Texas. New Mexico, a normally arid region, suffered rains in excess of 5 inches in October. Rains and melted snow from across the entire Mississippi River

Valley produced one of the major Mississippi River floods of this century.

An unprecedented number of low pressure systems formed in the Gulf of Mexico during that winter. These resulted in frequent gales over the Gulf and heavy rains over south Florida. Simultaneously, winter cold air outbreaks from the north were suppressed, so although the winter in the South was wet, it was generally mild.

The effect of El Niño on hurricanes and tropical storms is less well established, because the influences are inconsistent.

More information can be found at <http://www.pmel.noaa.gov/toga-tao/el-niño/home.html>.